EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

1st Player Steampunk 750W

Lab ID#: FP19750131
Receipt Date: Sep 12, 2019
Test Date: Oct 21, 2019

Report: 19PS884A
Report Date: Oct 30, 2019

DUT INFORMATION

Brand	1st Player
Manufacturer (OEM)	Helly Technology
Series	Steampunk
Model Number	PS-750SP
Serial Number	K9PSEE0496
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	47-63
Rated Power (W)	750
Type	ATX12V
Cooling	140mm Sleeve Bearing Fan (D14SH-12)
Semi-Passive Operation	✗
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	15	15	63	2.5	0.3
	Watts	100		750	12.5	3.6
Total Max. Power (W)		750				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18AWG	No
4+4 pin EPS12V (600mm)	2	2	18AWG	No
6+2 pin PCIe (500mm+150mm)	2	4	18AWG	No
SATA (450mm+150mm+150mm)	2	6	18AWG	No
4-pin Molex (450mm+150mm+150mm)	1	3	18AWG	No

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General Data	-
Manufacturer (OEM)	1st Player
PCB Type	Double Sided
Primary Side	**-**
Transient Filter	4x Y caps, 3x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x
APFC MOSFETS	2x Oriental Semiconductor OSG55R140F (600V, 14.5A @ 100°C, 0.14Ohm)
APFC Boost Diode	1x Global Power Technology G3S06508A (650V, 8A @ 150°C)
Hold-up Cap(s)	1x Rubycon (450V, 470uF, 2,000h @ 105°C, MXH)
Main Switchers	2x Oriental Semiconductor OSG55R140F (600V, 14.5A @ 100°C, 0.14Ohm)
APFC Controller	Champion CM6502UHHX
Resonant Controllers	Champion CM6901T6
Topology	Primary side: Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	**-**
+12V MOSFETS	4x Perfect Intelligent Power Semi PTP02N04N (40V, 210A @ 100°C, 2mOhm)
5V & 3.3V	DC-DC Converters: 4x Excelliance MOS Corp EMB06N03V (30V, 18.5A @ 100°C, 6mOhm) PWM Controllers: 2x ANPEC APW7073
Filtering Capacitors	Electrolytics: 9x Chengx (2-4,000h @ 105°C, GR), 1x Chengx (3-8,000h @ 105°C, EL), 2x Chengx (1,000h @ 105°C, ZF), 1x Asia'x (105°C, TNX) Polymers: 12x
Supervisor IC	SITI PS223 (OCP, OTP, OVP, UVP, SCP, PG)
Fan Model	Yate Loon D14SH -12 (140mm, 12V, 0.70A, Sleeve Bearing Fan)
5VSB Circuit	**-**
Rectifier	1x SB1045L SBR (45V, 10A)
Standby PWM Controller	Excelliance MOS Corp EM8564A

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	89.685%
Efficiency With 10W (≤500W) or 2% (>500W)	70.087
Average Efficiency 5VSB	78.434%
Standby Power Consumption (W)	0.0655405
Average PF	0.987
Avg Noise Output	34.23 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

230V

Average Efficiency	91.492%
Average Efficiency 5VSB	77.894%
Standby Power Consumption (W)	0.0884098
Average PF	0.955
Avg Noise Output	32.24 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2

HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	9
AC Loss to PWR_OK Hold Up Time (ms)	8.8
PWR_OK Inactive to DC Loss Delay (ms)	0.2

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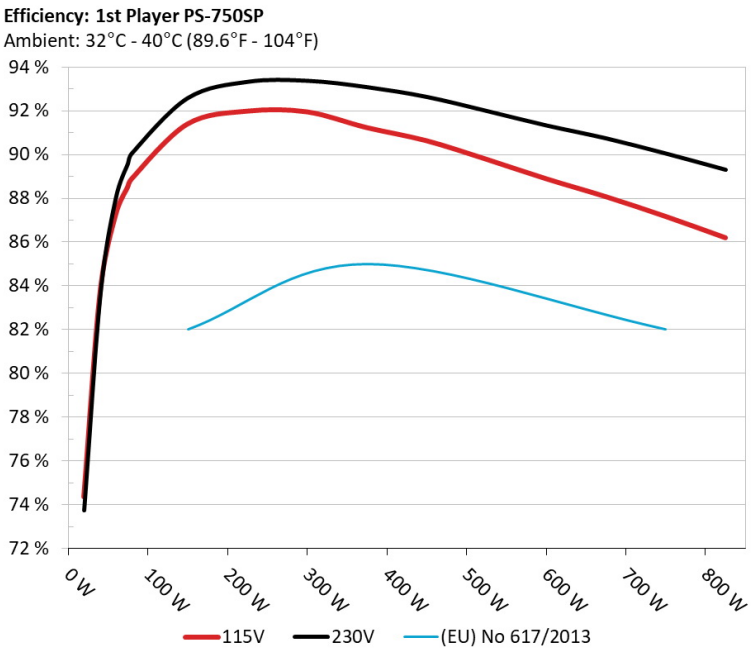
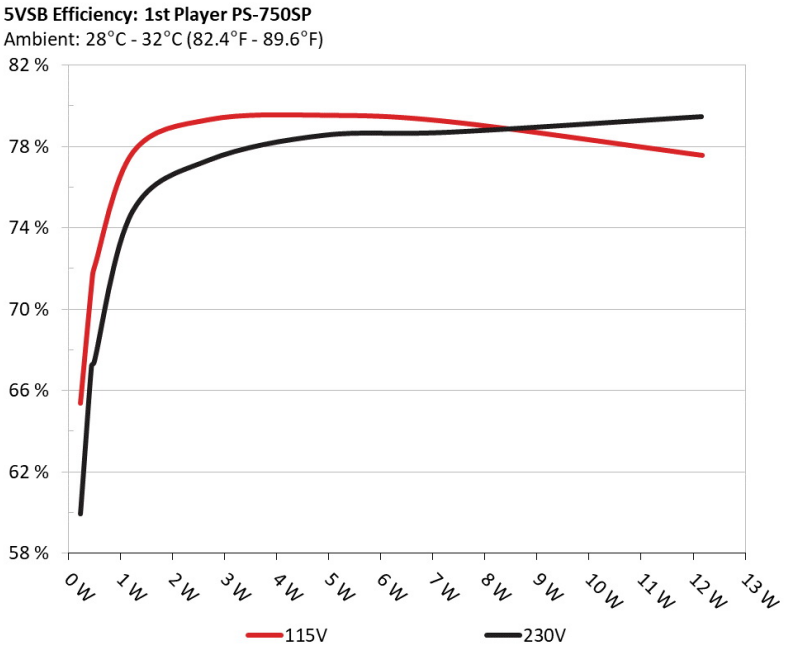
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



INFO

The PSU`s efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

5VSB EFFICIENCY



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

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5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.223	65.396%	0.044
	4.936V	0.341		115.11V
2	0.090A	0.445	71.429%	0.079
	4.935V	0.623		115.11V
3	0.550A	2.708	79.344%	0.313
	4.923V	3.413		115.11V
4	1.000A	4.910	79.553%	0.412
	4.910V	6.172		115.11V
5	1.500A	7.342	79.227%	0.465
	4.895V	9.267		115.11V
6	2.500A	12.172	77.583%	0.517
	4.869V	15.689		115.11V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.223	59.946%	0.015
	4.937V	0.372		230.27V
2	0.090A	0.445	67.221%	0.026
	4.936V	0.662		230.28V
3	0.550A	2.708	77.349%	0.130
	4.923V	3.501		230.25V
4	1.000A	4.911	78.563%	0.210
	4.911V	6.251		230.26V
5	1.500A	7.345	78.716%	0.277
	4.896V	9.331		230.26V
6	2.500A	12.164	79.477%	0.358
	4.865V	15.305		230.26V

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115V

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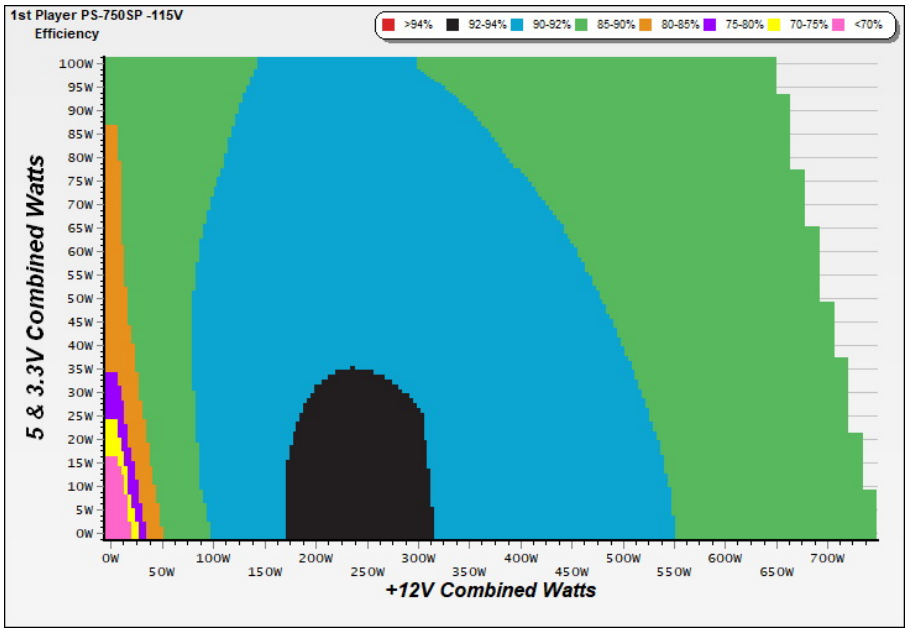
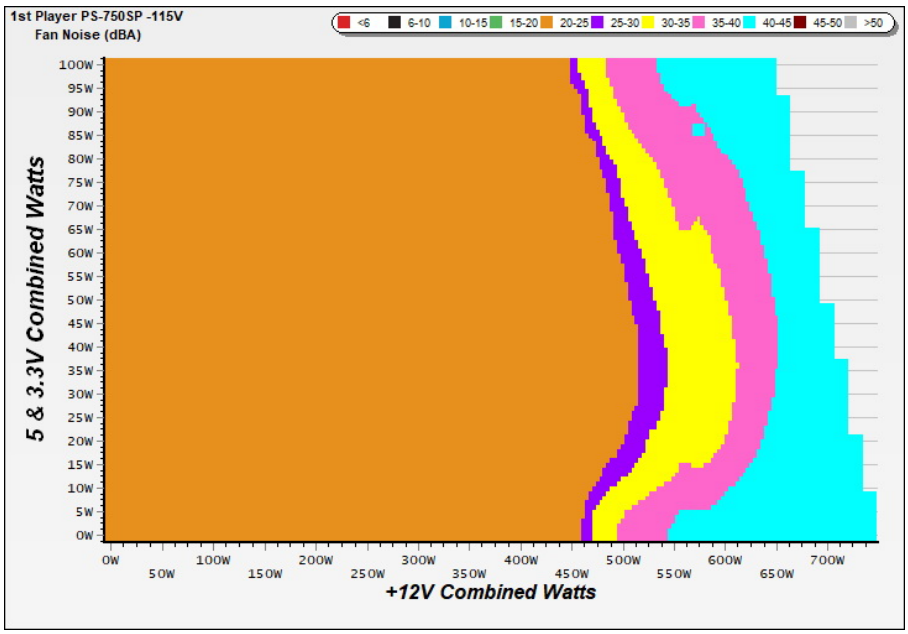
EFFICIENCY GRAPH 115V



INFO

This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

NOISE GRAPH 115V



INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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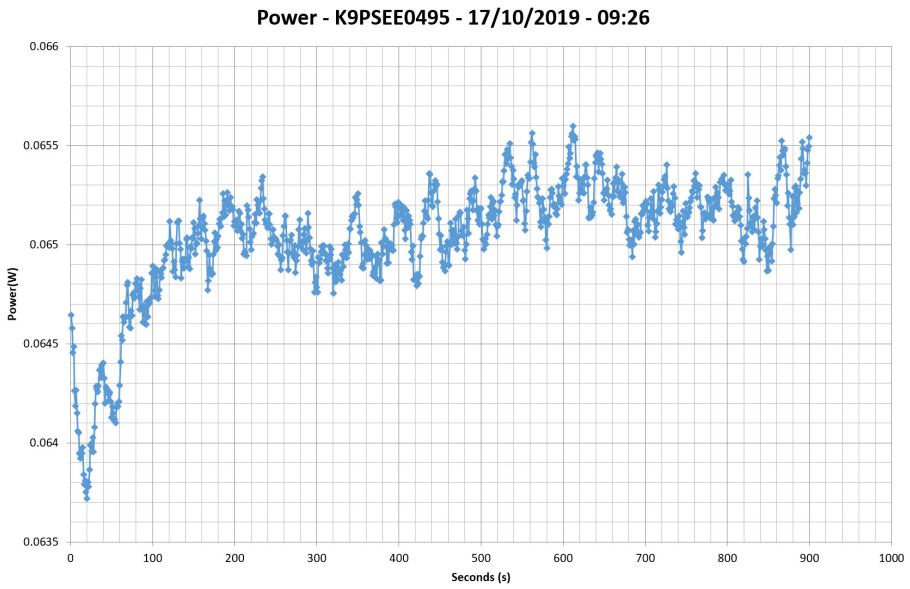
VAMPIRE POWER -115V



INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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10-110% LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	4.383A	1.967A	2.003A	0.987A	74.568	88.502%	847	22.9	34.22°C	0.966
	12.082V	5.088V	3.297V	5.067V	84.256				36.46°C	115.13V
2	9.822A	2.957A	3.013A	1.187A	149.484	91.384%	849	22.9	34.67°C	0.978
	12.072V	5.077V	3.286V	5.054V	163.578				38.13°C	115.13V
3	15.664A	3.456A	3.514A	1.389A	224.996	91.978%	851	23.0	35.04°C	0.981
	12.064V	5.067V	3.276V	5.041V	244.620				39.29°C	115.13V
4	21.448A	3.957A	4.043A	1.592A	299.777	91.945%	853	23.0	35.33°C	0.987
	12.055V	5.058V	3.266V	5.027V	326.041				40.45°C	115.13V
5	26.911A	4.956A	5.071A	1.795A	374.685	91.225%	857	23.1	36.10°C	0.990
	12.046V	5.047V	3.254V	5.015V	410.725				41.65°C	115.13V
6	32.383A	5.959A	6.106A	2.000A	449.606	90.629%	860	23.2	36.55°C	0.992
	12.037V	5.036V	3.242V	5.003V	496.096				42.85°C	115.12V
7	37.895A	6.969A	7.152A	2.206A	524.930	89.782%	1108	30.4	37.36°C	0.993
	12.028V	5.025V	3.230V	4.990V	584.674				44.34°C	115.12V
8	43.419A	7.983A	8.206A	2.413A	600.243	88.886%	1636	41.2	37.96°C	0.994
	12.018V	5.013V	3.218V	4.976V	675.296				45.58°C	115.12V
9	49.320A	8.499A	8.728A	2.416A	674.760	88.073%	1763	43.3	38.23°C	0.995
	12.008V	5.003V	3.208V	4.969V	766.140				46.69°C	115.11V
10	55.227A	9.017A	9.290A	2.522A	749.895	87.170%	1765	43.3	39.65°C	0.996
	11.999V	4.993V	3.197V	4.958V	860.268				48.77°C	115.11V
11	61.531A	9.032A	9.317A	2.527A	825.104	86.194%	1767	43.3	40.49°C	0.996
	11.992V	4.984V	3.188V	4.949V	957.265				50.38°C	115.11V
CL1	0.151A	12.005A	12.000A	0.000A	101.628	85.707%	866	23.8	36.33°C	0.982
	12.072V	5.054V	3.261V	5.118V	118.576				41.34°C	115.13V
CL2	62.524A	1.004A	1.001A	1.000A	764.108	87.660%	1768	43.3	39.43°C	0.996
	12.009V	5.020V	3.224V	4.990V	871.674				48.01°C	115.11V

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20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.202A	0.491A	0.486A	0.196A	19.638	74.364%	839	22.6	0.902
	12.087V	5.099V	3.309V	5.095V	26.408				115.13V
2	2.463A	0.983A	1.001A	0.393A	40.081	83.715%	843	22.8	0.946
	12.085V	5.095V	3.305V	5.087V	47.878				115.13V
3	3.656A	1.474A	1.483A	0.591A	59.575	87.245%	844	22.9	0.961
	12.083V	5.091V	3.300V	5.080V	68.285				115.13V
4	4.914A	1.968A	2.002A	0.789A	79.975	88.899%	846	22.9	0.966
	12.080V	5.087V	3.297V	5.072V	89.962				115.13V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	6.4 mV	6.4 mV	10.9 mV	4.0 mV	Pass
20% Load	7.9 mV	6.9 mV	11.9 mV	4.8 mV	Pass
30% Load	10.0 mV	7.1 mV	12.8 mV	5.3 mV	Pass
40% Load	12.4 mV	7.3 mV	13.2 mV	5.8 mV	Pass
50% Load	14.2 mV	8.0 mV	14.0 mV	6.5 mV	Pass
60% Load	17.1 mV	8.0 mV	14.6 mV	7.4 mV	Pass
70% Load	19.7 mV	8.8 mV	16.4 mV	8.5 mV	Pass
80% Load	21.8 mV	9.9 mV	18.9 mV	9.1 mV	Pass
90% Load	25.0 mV	10.2 mV	17.7 mV	10.3 mV	Pass
100% Load	29.3 mV	11.7 mV	18.6 mV	11.3 mV	Pass
110% Load	32.3 mV	12.8 mV	19.6 mV	12.0 mV	Pass
Crossload 1	8.2 mV	8.6 mV	12.4 mV	6.0 mV	Pass
Crossload 2	29.8 mV	11.0 mV	18.5 mV	10.8 mV	Pass

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230V

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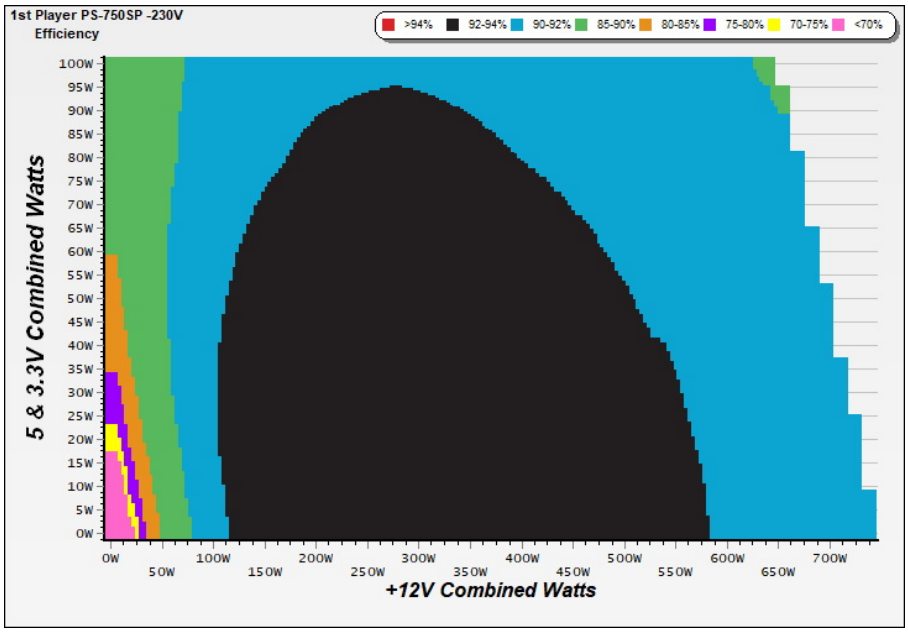
EFFICIENCY GRAPH 230V



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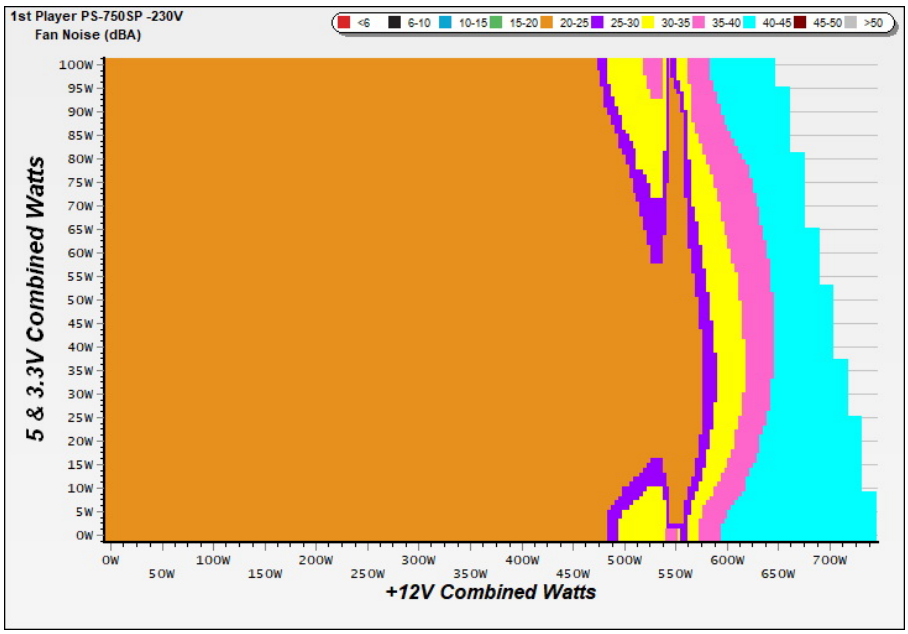
NOISE GRAPH 230V



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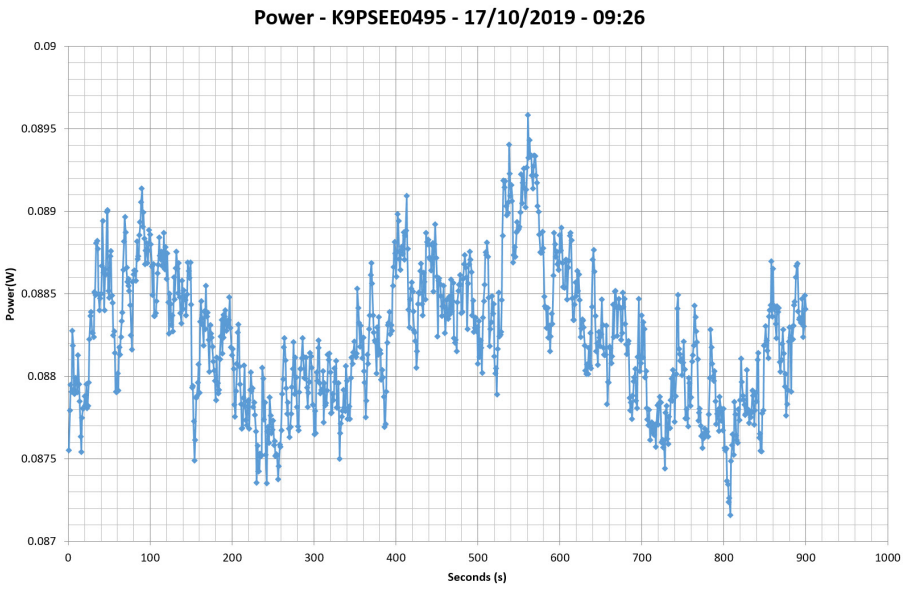
1st Player Steampunk 750W

VAMPIRE POWER -230V



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1st Player Steampunk 750W

10-110% LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	4.384A	1.967A	2.001A	0.987A	74.559	89.573%	853	23.0	34.01°C	0.856
	12.080V	5.087V	3.296V	5.066V	83.238				36.87°C	230.26V
2	9.823A	2.956A	3.015A	1.188A	149.474	92.569%	855	23.1	34.37°C	0.931
	12.070V	5.076V	3.284V	5.054V	161.473				37.92°C	230.26V
3	15.669A	3.456A	3.513A	1.389A	225.014	93.318%	857	23.1	35.73°C	0.954
	12.062V	5.067V	3.274V	5.041V	241.127				40.10°C	230.25V
4	21.451A	3.956A	4.044A	1.592A	299.779	93.365%	858	23.2	35.80°C	0.964
	12.054V	5.057V	3.264V	5.027V	321.082				41.23°C	230.26V
5	26.911A	4.957A	5.073A	1.795A	374.688	93.074%	859	23.2	36.13°C	0.970
	12.046V	5.046V	3.253V	5.015V	402.568				42.25°C	230.26V
6	32.385A	5.961A	6.109A	2.000A	449.604	92.627%	860	23.2	36.45°C	0.973
	12.036V	5.035V	3.241V	5.003V	485.393				43.31°C	230.27V
7	37.902A	6.970A	7.153A	2.206A	524.930	91.986%	1090	29.7	37.07°C	0.977
	12.026V	5.024V	3.229V	4.989V	570.662				44.56°C	230.27V
8	43.428A	7.983A	8.206A	2.413A	600.247	91.319%	1619	41.2	37.69°C	0.980
	12.016V	5.012V	3.217V	4.976V	657.307				46.14°C	230.26V
9	49.324A	8.501A	8.732A	2.417A	674.766	90.733%	1765	43.3	38.60°C	0.981
	12.007V	5.002V	3.207V	4.968V	743.685				47.46°C	230.26V
10	55.227A	9.019A	9.294A	2.523A	749.892	90.039%	1767	43.3	39.83°C	0.982
	11.999V	4.991V	3.196V	4.957V	832.850				49.33°C	230.27V
11	61.537A	9.036A	9.321A	2.528A	825.111	89.296%	1767	43.3	40.42°C	0.984
	11.991V	4.982V	3.186V	4.947V	924.020				50.34°C	230.27V
CL1	0.150A	12.005A	12.000A	0.000A	101.581	86.902%	867	23.8	35.73°C	0.905
	12.072V	5.052V	3.260V	5.117V	116.891				42.55°C	230.27V
CL2	62.520A	1.002A	1.002A	1.000A	764.050	90.610%	1769	43.3	40.12°C	0.983
	12.009V	5.019V	3.223V	4.989V	843.230				49.00°C	230.27V

Anex

1st Player Steampunk 750W

20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.208A	0.492A	0.484A	0.196A	19.703	73.725%	851	23.0	0.589
	12.082V	5.099V	3.307V	5.095V	26.725				230.26V
2	2.466A	0.982A	0.999A	0.393A	40.082	83.581%	852	23.0	0.747
	12.076V	5.095V	3.303V	5.087V	47.956				230.26V
3	3.656A	1.473A	1.487A	0.591A	59.576	88.018%	852	23.0	0.826
	12.081V	5.091V	3.300V	5.080V	67.686				230.26V
4	4.915A	1.967A	2.001A	0.789A	79.972	90.062%	853	23.0	0.866
	12.079V	5.087V	3.296V	5.072V	88.797				230.25V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	8.5 mV	6.5 mV	10.5 mV	4.2 mV	Pass
20% Load	7.1 mV	6.6 mV	12.1 mV	4.5 mV	Pass
30% Load	9.7 mV	7.5 mV	13.2 mV	5.1 mV	Pass
40% Load	11.5 mV	7.5 mV	13.5 mV	5.7 mV	Pass
50% Load	13.8 mV	7.7 mV	14.4 mV	6.4 mV	Pass
60% Load	16.4 mV	8.5 mV	14.8 mV	7.4 mV	Pass
70% Load	18.7 mV	8.9 mV	16.2 mV	8.7 mV	Pass
80% Load	21.0 mV	9.3 mV	16.7 mV	9.6 mV	Pass
90% Load	23.7 mV	10.0 mV	17.3 mV	10.0 mV	Pass
100% Load	28.4 mV	10.6 mV	17.2 mV	11.1 mV	Pass
110% Load	31.8 mV	11.8 mV	17.5 mV	11.9 mV	Pass
Crossload 1	9.1 mV	8.6 mV	12.6 mV	5.7 mV	Pass
Crossload 2	28.6 mV	9.9 mV	16.7 mV	10.8 mV	Pass

Anex

1st Player Steampunk 750W

Top side

Power specifications label

CERTIFICATIONS 115V

CERTIFICATIONS 230V